REMARKS

Claims 1-10, 12-17 and 19-49 are currently pending in the subject application and are presently under consideration. Claims 13, 14, 21 and 38 have been amended as shown on pages 2-10 of Reply. It is respectfully submitted that no new subject matter has been added and claims amendment would not require any further search by Examiner.

Favorable reconsideration of the subject patent application is respectfully requested in view of the comments and amendments herein.

I. Objection to Claims 21-22, 24, and 27-28

Claims 21-22, 24, and 27-28 are objected to because of certain informalities. Withdrawal of this objection is requested in view of amendments to claim 21.

II. Rejection of Claim 38 Under 35 U.S.C. §101

Claims 38 stand rejected under 35 U.S.C. §101 because the claimed invention is directed to non-statutory subject matter. In view of the amendment to the subject claim, this rejection of claim 38 should be withdrawn.

III. Rejection of Claim 38 Under 35 U.S.C. §102(e)

Claim 38 stands rejected under 35 U.S.C. §102(e) as being anticipated by Bryant et al. (US 2004/0236450 A1). This rejection should be withdrawn for at least the following reasons. Bryant *et al.* does not disclose or suggest every limitation set forth in the subject claims.

> A single prior art reference anticipates a patent claim only if it ***expressly or inherently describes each and every limitation set forth in the patent claim***. Trintec Industries, Inc. v. Top-U.S.A. Corp., 295 F.3d 1292, 63 USPQ2d 1597 (Fed. Cir. 2002); See Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The ***identical invention must be shown in as complete detail as is contained in the ... claim***. Richardson v. Suzuki Motor Co., 868 F.2d 1226, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989) (emphasis added).

Claim 38 recites *a data packet adapted to be transmitted between at least two computer processes running on a machine-implemented system, comprising a data field comprising*

information that regulates operation of a business component based at least upon prognostic data derived by a classifier performing a probabilistic analysis for future state of at least a subset of the operations concerning a machine and ***a desired operating point selected within an allowable range of operation about a system set point according to performance characteristics associated with at least one of the machines***. Bryant *et al.* does not disclose or suggest these novel features.

Bryant *et al.* relates to a method of diagnosing state of a system in which a measured signal is compared to an expected signal, and the comparison is used to perform the diagnosis. At page 9 of the Final Office Action, it is erroneously asserted that Bryant teaches *a data field comprising information that regulates operation of a business component based at least upon prognostic data derived by a classifier performing a probabilistic analysis for future state of at least a subset of the operations concerning a machine.* The cited potions of reference (Bryant *et al.*) merely disclose a method for assembling a model having correspondences with a physical system. The system is monitored so that the model parameters may be tuned to mimic the real system, whereupon the model can be manipulated to study behavior of the system. A system diagnosis is obtained by measuring "noise" in the machine, *i.e.* the difference between the actual signal as measured from the machine, and the expected signal (See, paragraphs [0114]-[0122], [0125]-[0132], [0092], [0093] and [0107]). In the Abstract *inter alia*, Bryant *et al.* states that the model may have parameters, associated with features and/or faults of the system, that are used in diagnosing the state of the system, and that "*selectively repeated diagnosis over time may yield a prognosis of the system.*" (*See*, Paragraph [0122]) adds that "a prognosis may predict the failure of a part." It is clear that Bryant *et al.* can only be used to model the current state of a part in a system and observe a trend, which is very different from the claimed subject matter. Further at page 9 of Office Action, it is erroneously asserted that Bryant teaches *selecting a desired operating point within an allowable range of operation about a system set point according to performance characteristics associated with at least one of the machines.* The cited portions of reference (Bryant) provides for calculating the rate of information (R) associated with a desired job to be performed by the machine. R depends on the desired speed at which the machine does the job, desired loads, complexity of the job and the desired accuracy at which the machine should do the job. R is compared with the channel capacity of the machine(C), which is the maximum amount of information that can be observed successfully conveyed through the

machine. If R≦C, the machine will perform the desired job within the desired precision. If not, the system has functionally failed (*See*, Paragraphs [0119] & [0120]). Hence Bryant provides for only determining if a machine is functionally well or not. However nowhere do Bryant *et al.* teach or suggest *a desired operating point being selected within an allowable range of operation about a system set point according to performance characteristics associated with at least one of the machines*. Therefore, Bryant *et al.* fails to disclose "every aspect of the claimed subject matter" and for at least these reasons, the rejection of amended claim 38 should be withdrawn.

IV. Rejection of Claims 1-10, 12-17, 19-37, and 39-49 Under 35 U.S.C. §103(a)

Claims 1-10, 12-17, 19-37, and 39-49 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Gotou *et al.* (US 2002/0013635 A1) in view of Bryant *et al.* (US 2004/0236450 A1). This rejection should be withdrawn for at least the following reasons. Gotou *et al.* and Bryant *et al.*, taken alone or in combination, do not disclose or suggest every limitation set forth in the subject claims.

> A factfinder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning. See *KSR v. Teleflex*, 550 U.S. ___, 127 S. Ct. 1727 (2007) citing Graham v. John Deere Co. of Kansas City, 383 U. S. 1, 36 (warning against a "temptation to read into the prior art the teachings of the invention in issue" and instructing courts to "'guard against slipping into the use of hindsight'" (*quoting Monroe Auto Equipment Co. v. Heckethorn Mfg. & Supply Co.*, 332 F. 2d 406, 412 (CA6 1964))).

Applicant's claimed subject matter provides systems and methods for controlling a motorized system in order to achieve set point operation as well as to optimize one or more performance characteristics associated with the system while operating within specified operating constraints. Specifically, independent claim 1 recites a *system that facilitates optimizing industrial business operations,* including a *prognostics engine that infers at least one future state of the operations based in part on the received data*, the prognostics engine comprising *a plurality of intelligent software agents that serve as proxies for at least the subset of machines, for modeling and representing interactions with one another and for facilitating convergence on modification and control of the subset of machines, for efficiently optimizing*

industrial business operations; and an optimization component that selects a desired operating point as an optimum performance point within an allowable range of operation about a system set point according to performance characteristic associated with at least one of the machines and controls at least one machine according to the desired operating point. Gotou *et al.* and Bryant *et al.*, taken alone or in combination, do not disclose or suggest these novel features of applicant's claimed subject matter.

Gotou *et al.* relates to a system for monitoring the status of abnormality and lifetime of machine components such as a bearing having rolling elements. The system includes a plurality of determining units each connected with a plurality of sensors and a control means connected with the determining units. The Examiner concedes that Gotou *et al.* does not teach all limitations recited in the subject independent claims, and attempts to cure the deficiencies of Gotou *et al.* with Bryant *et al.* However, Bryant *et al.* merely relates to a method of diagnosing state of a system in which a measured signal is compared to an expected signal, the comparison is used to perform the diagnosis and the repeated diagnosis over the time yield a prognosis of the system; and this reference does not make up for the aforementioned deficiencies of Gotou *et al.*

At page 11 of Final Office Action, it is erroneously asserted that Gotou *et al.* substantially teaches *the prognostics engine comprising a plurality of intelligent software agents that serve as proxies for at least the subset of machines, for modeling and representing interactions with one another, and for facilitating convergence on modification and control of the subset of machines, for efficiently optimizing industrial business operations.* Applicant's representative respectfully disagrees. At the indicated portions, Gotou *et al.* provides a sensor to detect influence signal that carry information about strains, change in load, vibration etc. Each of the determining units determines the presence or absence of an abnormality and the status of lifetime based on influence signal that has resulted from passage of the rolling elements, and contains a defect signal component, if there is any defect in any machine component (*See*, paragraph [0013]). A diagnostic component diagnoses a state of the lifetime of the machine component in reference to the sensor information. Lifetime resulting from an abnormality such as material collision is also considered. The diagnosis result information brought as a result of diagnoses by the diagnosing component is transmitted to the client corporation and so the machine component can be diagnosed at the business establishment of the manufacturing and selling corporation at a remote location (*See*, Paragraph [0051] and [0052]). Hence Gotou *et al.*

provides for only *determining and diagnosing any abnormality associated with any machine component* and nowhere teaches or suggests *a plurality of intelligent software agents that serve as proxies for at least the subset of machines, for modeling and representing interactions with one another, and for facilitating convergence on modification and control of the subset of machines, for efficiently optimizing industrial business operations.*

At page 5 of Final Office Action, Examiner contends that Gotou clearly discloses monitoring machine components and determining an abnormality of such components of a machine and Bryant clearly discloses a model-based machine diagnostics and prognostics. Therefore a prognosis of components of a machine using intelligent software is taught by Gotou and Bryant. Applicants' representative disagrees and respectfully submits that Gotou provides for only determining if there is some abnormality associated with any machine component by monitoring the defect signal component. Bryant provides for only a model having parameters that are associated with features and faults of system, diagnosing the state of the system by using the parameters and yielding a prognosis of the system by selectively repeated diagnosis over time. Hence Bryant merely provides for a model having parameters representing faults of system and helping in diagnosing the state of the system. However Bryant does not contemplate a plurality of intelligent software agents *that serve as proxies for at least the subset of machines, for modeling and representing interactions with one another, and for facilitating convergence on modification and control of the subset of machines,* for efficiently optimizing industrial business operations. The intelligent agents are software models representative of their various physical or software counterparts, and these agents serve as proxies for their counterparts and facilitate execution of various aspects. Hence rather than executing an optimization algorithm for example on a respective device directly, such algorithms can be first executed on the respective agents and than once the system decides on an appropriate set of modifications the final modifications are implemented at the agent counterparts with the agents carrying the instructions for such modifications.

At page 11 of Final Office Action, it is erroneously asserted that Gotou *et al.* teaches *an optimization component that selects a desired operating point as an optimum performance point within an allowable range of operation about a system set point according to performance characteristics associated with at least one of the machines and controls at least one machine according to the desired operating point*, with respect to independent claim 1. The cited portion

of reference (Gotou *et al.*) provides for a determining unit for determining whether or not a defect signal component contained in a sensor waveform deviates from a predefined range. If the defect signal has been determined as deviating from the predefined range, the sensor waveform contains an abnormality. Comparison between the defect signal component and the predefined range can be affected to any of the amplitude, the signal width and the phase appearing in the defect signal (*See*, Page 2, Paragraph [0020]). The control means has a capability of commanding setting and changing of the process set-up condition for each of the determining units and each of the determining units is capable of changing the process set-up condition according to the command from the control means. By allowing the control means to have a capability of commanding setting and changing of the process set-up condition for each of the determining units, the process set-up condition for each of the plural determining units can be easily set and changed (*See*, Paragraphs [0026] & [0027]). Hence Gotou *et al.* provides for only detecting presence or absence of abnormality in a machine component and changing of the process set-up condition for each of the determining units, if the determining unit determines that the defect signal component contained in a sensor waveform deviates from a predefined range and there is abnormality in the machine component. More particularly, Gotou *et al.* provides for determining if a defect signal component for a machine component deviates from a predefined range and changing the process set-up condition for the machine component so that the defect signal component is within the predefined range. It is respectfully submitted that the control means *individually changes* the process set up condition for each of the machine component *so that they operate within their predefined range*. However nowhere does the control means selects some specific operating point within an allowable range of operation about a system set point according to performance characteristics associated with at least one of the machines and controls the at least one machine according to the specific operating point. Hence Gotou *et al.* fails to teach or suggest *selecting* ***a desired operating point within an allowable range of operation*** *about a system set point* ***according to performance characteristics associated with at least one of the machines*** *and controlling at least one machine according to the desired operating point*.

At page 6 of Final Office Action, Examiner contends that Gotou *et al.* discloses selecting a desired operating point within an allowable range of operation about a system set point according to performance characteristics associated with at least one of the machines and

controlling the at least one machine according to the desired operating point. The Examiner submits that deviation from a predefined range results in an abnormality and takes a note that any point between the predefined range corresponds to a normal system operation and any deviation from such range corresponds to abnormal system and therefore there is a control aspect with respect to the desired operating point and the process set-up condition must be between an allowable range otherwise the system would be uncontrollable. Applicants' representative disagrees and respectfully submits that Gotou *et al.* provides for changing process set-up condition for a machine component if defect signal component measured for the machine component is outside the predefined range and hence each of the machine components operates in their individual ranges so that the defect signal component for the machine components remains within the predefined range. Hence each of the machine components operates in their predefined range of operation. More particularly, the control means individually controls each of the determining units of machine components so that the defect signal component for each of the machine component is within the predefined range. However nowhere Gotou *et al.* does teach or suggest *selecting a specific or desired operating point* within the allowable range of operation *about a system set point according to performance characteristic associated with at least one of the machines* and controlling at least one machine *according to the desired operating point*. This feature facilitates correlating efficiency information related to the components of the system, along with such efficiency information related to components of a larger process or system of which the system is a part, in order to select the desired operating point for optimization of overall system efficiency. For example, the pump may be operated within the allowable range about the set point in order to achieve global optimization of one or more performance characteristics of a larger process or system of which the pump system is a part. Thus the components (*e.g.*, pump, motor, drive) of the system may be operated at less than optimal efficiency in order to allow or facilitate operation of such a larger process at optimal efficiency.

At page 14 of the Final Office Action, it is erroneously asserted that Gotou *et al.* substantially teaches *correlating at least two of motor efficiency information, pump efficiency information, and motor drive efficiency information in order to derive correlated system efficiency information and selecting the desired operating point as the optimum efficiency point within the allowable range of operation according to the correlated system efficiency information*, with respect to dependent claim 14. The cited portion of the reference (Gotou *et*

al.) provides for a machine component of a type provided with rolling elements such as those used in a rolling bearing, a constant speed joint, and a ball screw mechanism. A machine comprises a plurality of the machine components, and may be installed on production or servicing line of a manufacturing plant (*See*, Paragraph [0208]). The other section of reference (Gotou *et al.*) provides for a determining unit for determining whether or not a defect signal component contained in a sensor waveform deviates from a predefined range. If the defect signal has been determined as deviating from the predefined range, the sensor waveform contains an abnormality (*See*, Paragraph [0020]). Hence Gotou *et al.* provides for only a machine comprising a plurality of the machine components which are of a type provided with rolling elements and determining if a machine component contains an abnormality and fails to teach or suggest *correlating at least two of motor efficiency information, pump efficiency information, and motor drive efficiency information in order to derive correlated system efficiency information and selecting the desired operating point as the optimum efficiency point within the allowable range of operation according to the correlated system efficiency information.*

At page 7 of Final Office Action, Examiner contends that Gotou discloses *correlating at least two of motor efficiency information, pump efficiency information, and motor drive efficiency information in order to derive correlated system efficiency information and selecting the desired operating point as the optimum efficiency point within the allowable range of operation according to the correlated system efficiency information.* Examiner submits that deviation from a predefined range results in an abnormality and any point between the predefined range corresponds to normal system operation and any deviation from such range corresponds to abnormal system operation and therefore there is a control aspect with respect to the desired operating point. By allowing the control means to have a capability of commanding setting and changing of the process setup condition for each of the determining units and each of the determining units is capable of changing the process setup condition according to command from the control means. The process set-up condition must be between an allowable range otherwise the system would be uncontrollable. The control means has the capability of collecting the results from each of the determining unit and changing the setup conditions for each determining unit. Therefore there is a correlation of at least two of the different parameters being monitored has to take place. Applicants' representative disagrees and respectfully submits that the control means individually controls each of the determining unit for the machine

components and if defect signal component of any machine components is outside the predefined range, the control means changes the process setup condition for the machine component so that the defect signal component is within the predefined range. More particularly, the control means individually interacts with each of the determining units and individually changes process setup condition for each of the determining unit. However nowhere the control means does correlate at least two of motor efficiency information, pump efficiency information, and motor drive efficiency information in order to derive correlated system efficiency information and select the desired operating point as the optimum efficiency point within the allowable range of operation according to the correlated system efficiency information. This feature facilitates determining a desired operating point within the allowable operating range at which the efficiency of the system or a larger process is optimal. The correlation of one or more of the pump efficiency information related to the pump, motor efficiency information related to the motor, and motor drive efficiency information related to the motor drive is computed and employed to provide near-optimal operation to enhance robustness (*e.g.*, to reduce sensitivity), in order to provide better overall optimization.

Therefore, Gotou *et al.* and Bryant *et al.*, taken alone or in combination, fail to disclose or suggest every aspect of the claimed subject matter. For at least these reasons, the rejection of independent claims 1, 10, 33, 39, 40, 44 and 47 (and claims that depend there from) should be withdrawn.

CONCLUSION

The present application is believed to be in condition for allowance in view of the above comments and amendments. A prompt action to such end is earnestly solicited.

In the event any fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063 [ALBRP246USC].

Should the Examiner believe a telephone interview would be helpful to expedite favorable prosecution, the Examiner is invited to contact applicants' undersigned representative at the telephone number below.

Respectfully submitted,

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